



ACADEMIC MOTIVATION OF SECONDARY SCHOOL STUDENTS: A CRITICAL STUDY

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Abstract:

Academic motivation is an essential part of learning and achievement. It is the most important factor that leads one to one's goals. This drive is known as motivation. This study aims at investigating the effect of academic motivation on secondary school-students gender and habitat wise. The authors adopted a test (Bhattacharya, 1980) on academic motivation selecting 6 (six) dimensions. Internal consistency of test was found by Cronbach Alpha. The test was administered on 700 ninth grade students of both sexes drawn from different schools under West Bengal Board of Secondary Education. The analysis with ANOVA conclusively showed that students significantly differ sex wise on academic motivation, but there is no significant difference between urban & rural students or in any strata of them.

Keywords: academic motivation, achievement, habitat, gender

1. Introduction

Self-determination theory of Academic Motivation by Deci and Ryan (1985, 2000 & 2008) can reasonably explain the individual difference in terms of learning strategy, performance, persistence and the classroom climate. Nowadays, motivation of students has been changed and diverted from the ethics of education. It is frequently noticed

among the students that they often do not complete their tasks of learning in time and with due sincerity. The interaction between students and teachers are maintained at low key. Motivation is widely acknowledged to enhance performance and efficiency of the students as well as the men for learning. Even motivation modifies the learning goal and achievement of the students (Amrai et al. 2011). It refers to reasons that underlie the behavior that is characterized by willingness and choice. Academic motivation can develop confidence in one's ability along with an increased value of education and desire to learn. Motivation is closely related to learning achieving a desired object, nurture a hobby, attain a goal. It may be intrinsic as well as extrinsic. The use of positive or negative reinforcement given by the teacher may respectively encourage or diminish motivation of the students. The motivation specially used in academic affairs where students are actively involved is called academic motivation. Academic motivation is mainly intrinsic. Naturally, it varies from students to students. Teachers should create a supportive classroom environment to sustain and develop the academic motivation of the students. This supportive environment should correspond to goal structures, attributions, and external evaluation. Academically motivated students leave no stone unturned to trap his/her success showing applying self-efficacy. Right to education and health care of the students has been taken into account. To alleviate the economic distress of the girl students and the students of backward communities, different projects have been undertaken by state and central Govt. Due to advancement of technology, generous grants to all types of schools by Govt, developed transport system, gender equity programmes, arrangement of midday meals etc. It is expected that the academic motivation (AM) of the students increase and the difference among students in (AM) will diminish. Teachers quickly come to recognize the warning signs of poor motivation in their classroom: students put little effort into homework and class work assignments, slump in their seats and fail to participate in class discussion, or even become confrontational toward the teacher when asked about an overdue assignment. Under these conditions, it might be viable to estimate the AM of different sections of school students to understand the ongoing process and to take any further actions accordingly. A study is, therefore, necessary on academic motivation.

A number of studies have been undertaken for preparation of Academic motivation scales Vallerand et al. 1992 & Bozanoglu 2004). Vallerand and Bissonnette (1992) explored academic motivation in relation to persistence of freshman students and found that the higher levels of motivation predicted 'persistence' and lower levels of motivation predicted 'dropping the class'. Nolen and Nicholls (1993) studied the motivation of students in learning mathematics and found that the motivation is not same for the students of different grades. Verma (1995) studied that academic achievement of girl students in relation to their rural or urban background and found

that IX grade rural students scored higher than urban counterpart though they had lower level of aspiration and low intelligence quotient. Suneetha et al. (2001) studied age and gender differences as factors affecting academic achievement and explored that gender is the more important variable than intelligence quotient and girls are better in interaction and concentration. Adepoju (2002) studied location - factors and academic performance of secondary school students and found that significant difference exists in the academic performance of students in urban and rural secondary schools. Vansteenkiste, Simons, Lens, Soenens, and Matos (2005) found among the early adolescents in China that greater autonomous academic motivation is associated with more adaptive learning attitudes, greater academic success. Singha (2007) found no significant difference between boys and girls with respect to their self-concept.

Significant correlation between Academic Motivation and Academic Achievement was found by Kourosh Amrai et al (2011). Radhamani and Arulsamy (2011) found no significant difference on motivation between male and female, rural and urban as well as arts and science students. Not only learners, the academic motivation has been tested for pre service teachers also by Sahin and Cakar(2011). Bedel (2016) reported that motivation within individuals tends to vary across subject areas, and this domain specificity increases with age. Attitude towards teaching is not related to Academic motivation. (Bedel, 2015) Some studies have been done with the components of Academic motivation e.g. self-determination, self-efficacy, educational & professional aspiration, learning strategy also.

Very few studies could be found in literature on academic motivation of the school students hailed from of different sections of the society. To supplement the earlier researches a study, therefore, might be undertaken on "*Academic Motivation of Secondary School Students: A Critical Study*".

2. Variables

a) Major:

- Academic Motivation of the secondary school students.

b) Categorical variables:

- Habitat (urban-rural);
- Gender (boys-girls).

3. Definition of Academic motivation

Academic Motivation: "... the source of a person's motivation may be intrinsic, derived from internal processes, and/or extrinsic, the result of external forces. Likewise, individuals can be impelled to act by conscious and non-conscious motives. Academic motivation refers to the cause of behaviours that are in some way related to academic functioning and success." (Wikipedia)

Academic motivation is a student's desire (as reflected in approach, persistence, and level of interest) regarding **academic** subjects when the student's competence is judged against a standard of performance or excellence (McClelland, 1961; DiPerna & Elliott, 1999; Wigfield & Eccles, 2002).

3.1 Operational Definition

Academic motivation refers to cause of behaviours of the student related to academic affairs as follows:

- Student's interest in academic activities;
- Competence on academic functioning;
- Effort put forth on academic success;
- Persistence in work.

The student's competence or success is judged against a standard of performance or excellence to assess his/her academic motivation.

3.2 Selection of indicators for measurement

Following indicators have been selected for assessing AM

Studies at home (SH), Leisure time activities (LA), Attachment to school (AS), Educational Aspiration (EA), Professional Aspiration (PA), Liking for the Teacher (LT).

- SH, LA, AS & LT can throw light on Student's interest in academic activities & persistence in work;
- EA indicates competence in academic functioning;
- PA indicates academic success.

3.3 Delimitation of the Study

The study was delimited to the Secondary school students, from the selected district of West Bengal.

3.4 Population

Area: Students of WB, in the district of North 24 Parganas, Nadia and Hooghly. The schools of the concerned districts were selected randomly.

Class: IX (boys and girls both).

Medium of Instruction: Bengali.

Board: WB Board of Secondary Education.

Sample technique: cluster sampling.

Sample Size: 700 (Boys 354+Girls 346).

No. of schools: 22 (Boys 11+Girls 11).

3.5 Stratification

Table 1: Students & Habitat

| Gender ↓ | Habitat ↓ | | Total |
|-------------|--------------|-------|-------|
| | Urban | Rural | |
| Boys | 176 | 178 | 354 |
| Girls | 171 | 175 | 346 |
| Total | 347 | 353 | 700 |

3.6 Objectives of the Study

1. To find out if there is any significant gender wise difference on academic motivation among the students.
2. To find out if there is any significant habitat-wise difference on academic motivation among the students.
3. To find out if there is any significant difference on academic motivation among the students due to interaction of gender and habitat.

3.7 Hypotheses

The following **null** hypotheses are to be tested:

H₀₁: The boys and girls do not differ significantly in the mean scores on academic motivation.

H₀₂: The urban and rural students do not differ significantly in the mean scores on academic motivation.

H₀₃: The urban boys and urban girls do not differ significantly in the mean scores on academic motivation.

H₀₄: The rural boys and rural girls do not differ significantly in the mean scores on academic motivation.

H₀₅: The urban boys and rural boys do not differ significantly in the mean scores on academic motivation.

H₀₆: The urban girls and rural girls do not differ significantly in the mean scores on academic motivation.

3.8 Methodology

While conducting administration of the test over the students, the researchers delivered detailed instructions to the participants and they were asked to go through AM questionnaire and tick the appropriate response according to their own choice. The answer scripts were scored by the researchers for final test. Seven hundred students between age group 14-15 (class-IX) years formed the sample of the study.

3.9 Definition of the indicators of the test

- a) **Studies at home** are a course of study carried out at home, rather than in a traditional classroom setting. The devotion of time and attention to gaining knowledge of an academic subject, especially by means of books.
- b) **Leisure time activities-leisure time** is free from compulsory **activities** such as employment, running a business, household chores, education and other such day-to-day stresses, not including eating, and sleeping, it is often referred to as "free **time**." (Wikipedia)
- c) **Attachment to school** means engagement with school or classes.
- d) **Educational Aspiration** - aspiration is a strong desire, or ambition, or interest for achieving something. It is important as it encourages and energizes the individual student to achieve something and personal involvement with education ([Springer](#), 2014).
- e) **Professional Aspiration** - a *career aspiration* is a path that follows the career. It invests more power and greater responsibility to the profession or study course for betterment.
- f) **Liking for the Teacher** - it is a student-teacher relationship, to identify the characteristics of liked teachers and examine the impact of liking or disliking the teacher on student learning and motivation.

4. Tools

For the present study, the researchers have adapted the tools on **Academic Motivation Scales** and Questionnaire developed by Durgadas Bhattacharya, (1980), KU. Researchers finally adapted six dimensions, which are: **Studies at home, Leisure time activities, Attachment to school, Educational Aspiration, Professional Aspiration and Liking for the Teacher.**

4.1 Preparation of Items

Initially total no. of items in the test was 42 including both the positive and negative statements each having 5 options - Agree, Sometimes agree, Not sure, Most of the time don't agree, Not at all. The scores of the each item were 4,3, 2,1,0 respectively for the options for a positive statement and 0,1,2,3,4 for negative statement respectively. Maximum & minimum marks for the test as respectively 168 & 0

4.2 Item Analysis

This questionnaire comprised 42 items which were administered on two hundred students of class IX. Time allotted for the final test was 30 minutes. Directions for

answering the test were given in the test booklet and they were also verbally communicated to the students. The discrimination value of each item was determined and all values were ≥ 0.20 . Only two words, one in question no 7 and other in question no 29 were substituted by modern terms. The coefficient of correlation (by test re-test method) was $r = 0.67$, $df = 148$. Cronbach alpha was determined and its value stood as 0.725

Table 2: Dimensions of test-questions

| Sl.No | Dimensions of test-questions | Number of items |
|-------|------------------------------|-----------------|
| 1 | Studies at home | 7 |
| 2 | Leisure time activities | 7 |
| 3 | Attachment to school | 7 |
| 4 | Educational Aspiration | 7 |
| 5 | Professional Aspiration | 7 |
| 6 | Liking for the Teacher | 7 |
| | Total | 42 |

4.3 Presentation of Data

Table 3: The descriptive statistics sex-wise and strata-wise

| Pupils | Total | Boys | Girls | Urban | Rural | U. boys | U. girls | R. boys | R. girls |
|--------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| No. | 700 | 354 | 346 | 347 | 353 | 176 | 171 | 178 | 175 |
| Mean | 75.2643 | 72.7316 | 77.8555 | 75.0576 | 40.9433 | 73.1932 | 76.9766 | 72.2753 | 78.7143 |
| Median | 76.0000 | 74.0000 | 78.0000 | 76.000 | 41.0000 | 74.0000 | 77.0000 | 74.0000 | 79.000 |
| SD | 8.78662 | 9.35475 | 7.31898 | 8.08711 | 6.15354 | 8.55417 | 7.10505 | 10.08761 | 7.44239 |
| SKWN | -.783 | -.756 | -.462 | -.583 | -.253 | -.599 | -.316 | -.809 | -.639 |
| KRTS | 1.156 | .790 | .632 | .521 | -.107 | .314 | .088 | .848 | 1.313 |

The mean (75.2643) and median (76.0000) of the total sample are very close to each other. The distribution, therefore, is almost normal.

4.4 Administration of Test

The final form of the test was administered on 700 students selected by cluster sampling method for 30 minutes. The papers were scored. Maximum scores obtained for the test=100 and minimum scores obtained = 36

Table 4: Frequency distribution of AM scores for the total Sample

| Scores | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90-99 | 100-109 |
|----------|-------|-------|-------|-------|-------|-------|-------|---------|
| Freq (f) | 01 | 05 | 32 | 118 | 304 | 223 | 16 | 01 |

| Scores | f | CUM%F |
|---------|-----|-------|
| 30--39 | 1 | 0.14 |
| 40--49 | 5 | 0.86 |
| 50--59 | 32 | 5.43 |
| 60--69 | 118 | 22.29 |
| 70--79 | 304 | 65.71 |
| 80--89 | 223 | 97.57 |
| 90--99 | 16 | 99.86 |
| 100-109 | 01 | 100 |

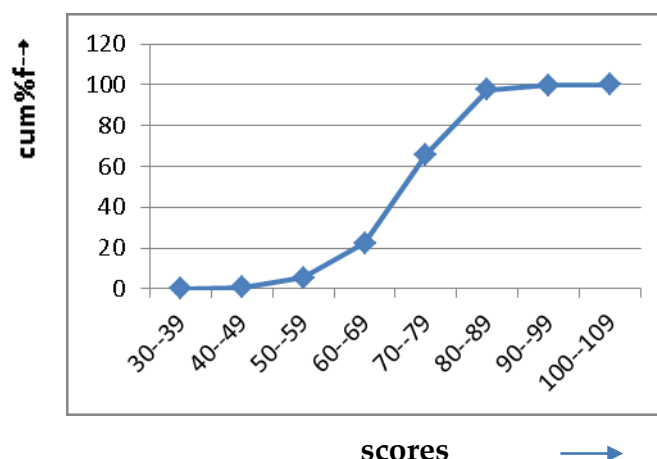


Figure 1: Ogive for total sample on AM

5. Data Analysis

For testing the null hypotheses, a 2x2 ANOVA and t-tests have been used. To find the main effect of Sex and Habitat ANOVA has been used. To find the interaction of sex and habitat explicitly t-tests have been used. For ANOVA 4(four) cells have been used as Urban Boys(UB), Urban Girls(UG), Rural Boys(RB), Rural Girls(RG). For each cell 50 AM scores have been randomly selected from the total number of the corresponding cell. The descriptive statistics of the **AM** scores of **200** students have been tabulated below sex and habitat-wise.

Table 5: Mean and SD of the 4 cells of ANOVA

| Categories | N | Mean | SD |
|-------------|----|---------|---------|
| U.BOYS(UB) | 50 | 73.5200 | 9.60493 |
| U.GIRLS(UG) | 50 | 78.0400 | 7.43944 |
| R.BOYS(RB) | 50 | 73.1400 | 9.50834 |
| R.GIRLS(RG) | 50 | 79.2800 | 7.98223 |

Table 6: 2x2 ANOVA for AM scores

| Sources | df | SS | Mean ss | F | Sig | P | Remarks |
|---------------|-----|-----------|----------|--------|------|--------|---------|
| Sex | 1 | 1420.445 | 1420.445 | 18.831 | .000 | P<0.05 | S |
| Habitat | 1 | 9.245 | 9.245 | .123 | .727 | P>0.05 | NS |
| Sex x Habitat | 1 | 32.805 | 32.805 | .435 | .510 | P>0.05 | NS |
| ERROR | 196 | 14784.500 | 75.431 | | | | |

Hence, Habitat and Interaction (Gender x Habitat) are not significant as shown in Table no. 7. But Gender is significant.

5.1 Interpretation

Table 6 shows that difference of mean scores in AM on the basis of sex is significant at 0.05 level. There is no significant difference habitat-wise. So (i) Boys and Girls significantly differ in their mean scores in AM. Hence, the null hypothesis H_{01} is rejected. (ii) Urban and Rural students do not significantly differ in their mean scores in AM. Hence, the null hypothesis H_{02} is retained.

Since sex difference is significant, it is necessary to use 't' tests for finding the significance of difference of means of different pairs of cells in different strata.

Table 7: t- test

| STRATA | MEAN | SD | SED | df | t-value | Sig.(2tailed) |
|--------|---------|---------|----------|----|---------|---------------|
| UB | 73.5200 | 9.60493 | 1.35834 | 49 | 02.680 | 0.010(S) |
| vs | vs | vs | vs | | | |
| UG | 78.0400 | 7.43944 | 1.05210 | | | |
| RB | 73.1400 | 9.50834 | 1.34468 | 49 | 03.171 | 0.003(S) |
| vs | vs | vs | vs | | | |
| RG | 79.2800 | 7.98223 | 1.12886 | | | |
| UB | 73.5200 | 9.60493 | 1.35834 | 49 | 0.213 | 0.832(NS) |
| vs | vs | Vs | vs | | | |
| RB | 73.1400 | 9.50834 | 1.34468. | | | |
| UG | 78.0400 | 7.43944 | 1.05210 | 49 | 0.872 | 0.388(NS) |
| vs | vs | vs | vs | | | |
| RG | 79.2800 | 7.98223 | 1.12886 | | | |

5.2 Interpretation of t-tests

From the analysis in table no 7, t- value for each of the pairs UB and UG; RB and RG is significant at 0.05 level. Hence, H_{03} and H_{04} are rejected. t-values for the difference of mean AM scores between urban boys (UB) and rural boys(RB) is 0.832($p>0.05$), urban girls(UG) and rural girls(RG) is 0.388($p>0.05$). Hence, t- is not significant at 0.05 level for

these two pairs. So, (i) UB and RB as also (ii) UG and RG do not significantly differ in mean scores in AM. Hence, H_{05} & H_{06} are retained.

6. Findings

The results in this study shows that there is a significant difference of mean scores in AM between (i) boys (B) and girls (G), (ii) urban boys and urban girls (iii) rural boys and girls; but there is no significant difference among urban (U) & rural (R) students and between any combinations of them.

6.1 Limitation of the study

The present study suffered from following limitations:

- i. Literature on academic motivation was severely limited.
- ii. Sample could not be always collected strictly in accordance with rule of cluster sampling due to administrative problems of many schools.
- iii. Due to time constraint, only schools were selected randomly from three districts - North 24 Parganas, Nadia & Hooghly of West Bengal.

7. Discussions

The present study on Academic Motivation (AM) on the secondary school students is integrally associated with the progress of education. The academic achievement, academic relationship, self-concept, and subject achievement of the students have explained in some earlier study on academic motivation. The present study suggests that it is essential to consider the type of motive when studying associations between academic motivation and learning. According to Bong (1996), researches on academic motivation suffer a setback due to divergent theories of academic motivation. Some suggestions were given by him in this respect.

7.1 Educational implications of the study

- I. Research on Academic Motivation of the students is the need of the hour. There is students' indiscipline in different institutions, large scale drop out, inattentiveness, shirking, unfair means in the examination, averseness to study, and disappointment among the school children. Scores on academic motivation can give an indication of these unassuming behaviours and actions of the students. So, remedial measures may be taken easily and quickly by the teacher on the basis of AM scores of the students.

- II. When advanced students require nurture and guidance from the teachers for more improvement and enrichment AM scores of the students might help teacher initially.
- III. AM is not only success-oriented, it depends also on techniques adopted to achieve the success. Aspiration level of the students for the success can be increased in order to enable them to select appropriate techniques for attaining the success. A research on AM can help them how to regulate Aspiration level of the students for attaining success.
- IV. Motivation & achievement motivation are very general and comprehensive but AM is more specific so far as academic activities are concerned. So in the academic canvas A M is very important.
- V. The school should provide better environment to improve the study habits with the help of different kinds of academic motivation. When proper infrastructural facilities for development of AM could be available in WB, only then enrichment of study habits is possible.
- VI. The students can increase their level of aspiration for success, modify student-teacher relationship and afford more time for their project works. Unless the academically motivated, they can't do these things. So teachers should use the teaching methods to increase the AM of the students.

On above considerations, a study on academic motivation is overdue.

7.2 Suggestions for further studies

A study on AM might be extended by:

- 1) Including different criteria like: students of different socio economic status, castes, age groups, grade level, management of school, school boards and characteristics of habitats.
- 2) Providing some novel opportunities like:
 - Opportunities for social interaction;
 - Completion of academic assignment with less stress;
 - Connection of academic activities with real-world situations;
 - Scope of meaningful choice wherever possible;
 - Learning as fun.

8. Conclusion

- In the colonial period, the scope of the girls for pursuing education in schools and colleges was very limited. In the economically backward families, the girls could hardly think of receiving education in schools. So their academic

motivation was unknown. Independent India witnessed the phenomenal increase expansion women's education. The slogan 'Betibachao, Betiparaho' is very popular and time honoured today. Their attendance in schools, participation in classroom activities, and other curricular and co-curricular activities is spectacular. Their self-concept and urge for success seem to be higher. Naturally, girls have shown higher academic motivation in comparison to boys. The present study also supports this.

- Urban rural difference is gradually decreasing due to technological advances and all out efforts taken by the Govts. Electricity, transport and other learning facilities tend to equalize the facilities of both rural and urban areas. Better achievements in Board examination frequently go in favour of rural students. So it is expected that rural and urban students have no reason to differ in academic motivation. The present study also supports this.

References

- 1) Bandura, A. (1986). *Social foundation of thought and action: A Social Cognitive Theory*. Upper Saddle River, NJ: Prentice Hall
- 2) Battacharya, D. (1980) 'Academic Motivation' Department of education, Kalyani University, WB, India
- 3) Bures, E. M., Abrami, P.C., Amundsen, C. (2000). *Students' Motivation to Learn via Computer Conferencing. Research in Higher Education*, 41 (5), 593-621.
- 4) Deci, E.L. & Ryan, R.M. (1985). *Intrinsic motivation and Self-Determination in Human Behavior*. New York: Plenum.
- 5) Deci, E.L. & Ryan, R.M. (2002). *Handbook of self-determination research*. Rochester, UK: University of Rochester Press.
- 6) Eccles, J., Midgley, C. (1989). *Stage/environment fit: Developmentally appropriate classrooms for early adolescents*. In R. Ames & C. Ames (Eds.), *Research on motivation in education*, (3), pp. 139-181. New York: Academic Press. Retrieved July 4th, 2011 from: <http://library.nau.edu>
- 7) Frey, B. S. (1994). *How Intrinsic Motivation is Crowded Out and In*. *Rationality and Society*, 6 (3), 334-352.
- 8) Fried, Y. & Ferris, G.R. (1987). *The Validity of the Job Characteristics Model: A Review and Meta-Analysis*. *Personnel Psychology*, 40, 287-322.
- 9) Gagné, M. & Deci, E.L. (2005). *Self-determination Theory and Work Motivation*. *Journal of Organisation Behavior*, 26 (4), 331-362.

- 10) Heckhausen, H. (1991). *Motivation and Action*. Cambridge: Cambridge University Press.
- 11) Kauffman, D. F., & Husman, J. (2004). *Effects of Time Perspective on Student Motivation: Introduction to a Special Issue*.
- 12) Kourosh Amrai, K. et al. (2011) *The relationship between academic motivation and academic achievement students*. Procedia Social and Behavioral Sciences 15 (2011) 399–402 Published by Elsevier Ltd.
- 13) Schunk, D. H. (1989). *Self-efficacy and achievement behaviors*. Education Psychology Review, 1, pp.173-207.
- 14) Vallerand, R. J., & Bissonnette, R. (1992). *Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study*. Journal of Personality, (60), pp.599-620.
- 15) Wilkesmann, U., Fischer, H. , & Virgillito, A. *Academic Motivation of Students-The German Case*, Discussion paper Nr. 2-2012
- 16) Young, A., Johnson, G., Hawthorne, M. & Pugh, J. (2011). *Cultural Predictors of Academic Motivation and Achievement: A Self-Deterministic Approach*. College Student Journal, (45), 1, pp.151-163, 13p.
- 17) Bandyopadhyay, S. (1995). *A study on impact of academic motivation on achievement of grade eight students in mathematics*, p. 20, Journal of Educational Psychology, Vol 80(3), Sep 1988, 260-267.
- 18) <http://dx.doi.org/10.1037/0022-0663.80.3.260> dt. 20.12.2016
- 19) <http://www.pearsonassessments.com/research> dt. 20.12.2016
- 20) <http://www.ripublication.com/ijepa.htm> dt. 20.12.2016
- 21) <http://www.shodhganga.inflibnet.ac.in>, dt 27.12.2016
- 22) <https://qspace.library.queensu.ca>, dt.28/01/2017
- 23) <http://www.Schoolteachersparents>, dt. 28/01/2017
- 24) <http://www.pearsonassessments.com>, Emily R. Lai (2011)

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